THE MAIN TAXONOMIC VIEW POINTS ON THE INTRA- AND THE INTERRELATIONSHIPS OF MELANTHIOIDEAE (LILIACEAE)

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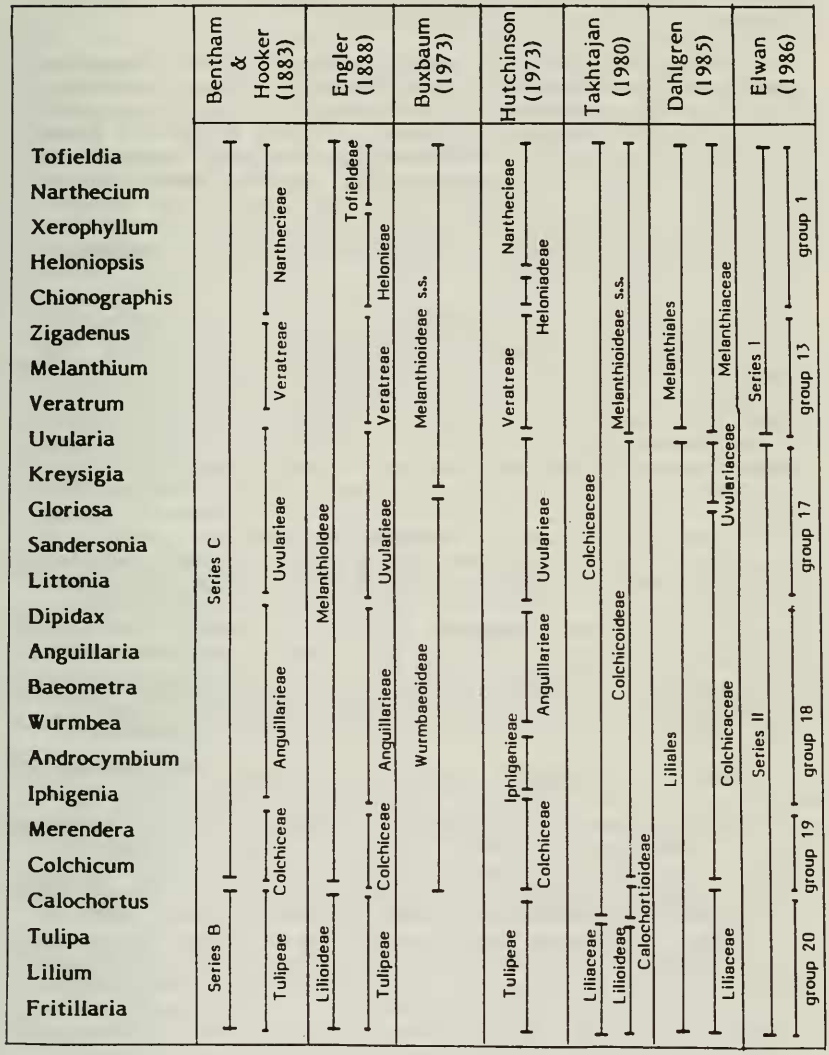
Melanthioideae is one of the largest subfamilies of Liliaceae in Engler (1888) system. It includes 6 tribes: Tofieleae, Helonieae, Veratreae, Uvularieae, Anguillarieae and Colchiceae. This subfamily is quite comparable to Bentham & Hooker (1883) series C. However, this series includes also Medeoleae (Asparagoideae-Parideae in Engler). Buxbaum (1937) separated the tuberous members of Melanthioideae in distinct subfamily (Wurmbaeoideae). This subfamily embodies Anguillarieae, Colchiceae, and Uvularieae p.p. (**Gloriosa, Littonia** and **Sandersonia**); whereas Melanthioideae **s.s.** includes the other 3 tribes in addition to **Uvularia, Kreysigia** and their relatives. Unlike Wurmbaeoideae, the rhizomatous Melanthioideae are mainly in Temp. N. hemisphere especially N. America and S.E. Asia. Within Uvularieae, **Uvularia** (rhizomatous) is N. am. while **Littonia, Gloriosa** and **Sandersonia** (tuberous) are trop. and S. Afr. (cf. Hutchinson, 1973). The distinction made by Buxbaum between the rhizomatous and the tuberous Melanthioideae had promoted a number of taxonomic arguments regarding the interrelationships within this subfamily. Hegnauer (1963), Wildmann & Pursey (1986) and Huber (1969) gave supports for the recognition of Wurmbaeoideae.

Within Liliaceae Hutchinson (1973) seemed not convinced with the subfamilial relationships, though he laid too much stress upon the nature of the rootstock; thus he recognised 28 consecutive tribes. In this system Medeoleae is transferred to Trilliaceae, while members of Melanthioideae **s.l.** are arranged in 8 tribes. However, the arrangement of these tribes reflects their vague relationships.

Takhtajan (1980) reflected also the heterogenity of Melanthioideae **s.l.** He recognised 2 subfamilies (Melanthioideae and Colchicoideae) under Colchicaceae (Liliineae). This family embraces also Calochortoideae (but not other Tulipeae). The Colchicoideae includes: Uvularieae, Glorioseae, Scoliopeae (= Medeoleae, = Parideae), Tricyrtideae, Anguillarieae and Colchiceae. Thus, Colchicoideae concept is wider than that of Wurmbaeoideae as to include in addition, **Uvularia, Medeola** and their allies.

Badawi & Elwan (1986) using a numerical analysis proposed a classification for Liliaceae **s.l.** In this classification Melanthioideae is seriously disrupted; Veratreae is separated not only from other Melanthioideae, but rather from other liliaceous taxa on the bases of a number of correlated characters. While Parideae (Medeoleae) is grouped

The classification of the cheif genera of Melanthioideae and Tulipeae in some systems



with Uvularieae. All the available information substantiates that Veratreae is a natural fairly distinct group, endemic to N. am., with related karyotype, marked capellary structure; and possessing related alkaloids (cf. Hegnauer, 1963; Sen, 1975; Sterling, 1982).

According to Takhtajan (1969) Melanthioideae **s.s.** with **Veratrum** comes nearest to the ancestral type of Liliales; while Hutchinson (1973) had claimed that Heloniadeae is the most ancient tribe of Liliaceae, being rhizomatous ebracteate. Cheadle & Kosaki (1971), Sen (1975) supported the primitiveness of Heloniadeae. Whether, Veratreae or Heloniadeae is the nearst to the ancestral origin of other liliaceous taxa, one can assume that the rhizomatous nature of the rootstock and the presence of raphides, which are generally present in Veratreae and Heloniadeae, are among the characters of the ancestral "Melanthioid" origin.

In view of many accumulated data Dahlgren **et al.** (1985) showed also that Melanthioideae **s.s.** and Colchicoideae can not, in any way, represent a natural assemblage, and the distinction between them has been raised to the order rank. Unlike Liliales (which embraces Colchicoideae), the Melanthiales endosperm formation is helobial, the tepals are less conspicous, rarely spotted or variegated and the raphides are generally present. Melanthiales includes: Melanthiaceae (incl. Petrosavieae) and Campynemaceae (Hypoxidaceae p.p. of the Haemodorales). Dahlgren **et al.** (1985) included members of Colchicoideae together with members of Iridaceae, Orchidaceae and some minor families in Order Liliales. They distinguished Colchicaceae, Uvulariaceae, Calochortaceae and Liliaceae (= Tulipeae including **Gagea** and **Medeola**) among the 10 families of the Liliales. This classification emphasizes the close relationship of not only **Calochortus** (as given by Takhtajan, 1980) but also of all other members of Tulipeae to members of Colchicoideae. Hereagain, although Dahlgren **et al.** (1985) did not suggest any ancestral origin of Liliales from Melanthiales, they stated that "within Liliales further differentiation may nave gone towards the loss of raphides".

Elwan (1986) arranged Liliaceae as recognized by Hutchinson (1973), i.e. excluding Parideae, which is also Dioscoreales in Dahlgren **et al.** (1985), in two groups. One of them accomodates only Uvularieae **s.l.** (incl. **Uvularia** and **Gloriosa**), Tricyrtideae, Anguillarieae, Iphigenieae, Colchiceae and Tulipeae. In other words, one of the two main groups of Liliaceae (as recognized by Hutchinson) includes only Colchicoideae and Tulipeae (incl. **Calochortus**), while all other liliaceous taxa are in the other main group. The distinction between these two groups is based mainly on the presence or absence of raphides among high tendencies of some other characters such as the nature of the rootstock, and the venation type of tepals. Only **Walleria*** in the "Colchicoideae & Tulipeae" group contains oxalate raphides.

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* **Walleria** is most probably Tecophilaeaceae (cf. Dahlgren et al., 1985, Elwan, 1986).

The absence of raphides in members of Colchicoideae and Tulipeae may distinguish them as one entity within Liliaceae (in the sense accepted by Hutchinson, 1973). Nevertheless, the distinction between members of Tulipeae at one hand and those of Colchicoideae on the other, was over looked by Elwan (1986). In this classification Uvularieae (incl. Tricyrtideae), Anguillarieae (incl. Iphegineae), Colchiceae and Tulipeae are arranged in four different groups of the same rank. However, the bulbous nature of the rootstock, the connate styles and the basifixed stamens in Tulipeae substantiate that this tribe is somewhat distinct from the other three tribes. An amendement should be considered in this classification to indicate such relationship.

Dahlgren **et al.** (1985) suspected that either or both **Medeola** and **Scoliopus** should be retained back from Trilliaceae, which contains raphides (cf. Dahlgren **et al.**, 1985), to Liliaceae **s.s.** or Uvulariaceae. Elwan (1979) recorded the presence of raphides in **Trillium ceruum** L., **T. govanianum** Wall. and **Paris quadrifolia** L. but not in **Medeola virginiana** L. Also Berg (1962) on embryological bases proved that **Medeola** and **Scoliopus** are not very much related to Trilliaceae. Sen (1975) on cytological bases, suggested the exclusion of **Scoliopus** in a tribe near Calochorteae. It seemed more acceptable, so far, to consider **Trillium** and **Paris** in Trilliaceae, while provisionally **Medeola** and **Scoliopus** are supplemented in Uvularieae or Tulipeae which represent the nearst devoid of raphides liliaceous relatives.

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